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ABSTRACT

This curriculum unit teaches students about the basic physical and political geography of Africa and introduces or reviews fundamental geographical concepts and vocabulary in an African context. The unit offers a geographic introduction to the map of Africa with a focus on sub-Saharan Africa in terms of its examples and information. Each of the unit's five lessons can be integrated into the curriculum where it best suits students' needs, but it is suggested that the unit be taught as a whole. The lessons are: (1) "Getting Oriented to Globes and Maps"; (2) "Countries of Africa"; (3) "Human and Environmental Interaction in Africa"; (4) "Learning the Physiographic Features of Africa"; and (5) "African Climate." Transparencies, student handouts, and appendices containing conversion tables and a data bank are included. (EH)

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Mapping Africa

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A Curriculum Unit for Grades 6-10

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MAPPING AFRICA

A Curriculum Unit
Grades Six to Ten

Developed by

Africa Project
Stanford Program on International and Cross-Cultural Education (SPICE)

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MAPPING AFRICA

Rationale

Mapping Africa has been designed to serve two major purposes. First, the unit teaches students about the basic physical and political geography of Africa. Second, it introduces or reviews fundamental geographical concepts and vocabulary in an African context.[1]

In a world so shrunken in time and distance that we can communicate almost instantly with any other city on any continent and fly to even more corners of the world in a matter of hours, a knowledge of different places can no longer be considered a luxury. Instead, it has become a necessity. Our interdependence is now so complete that actions—be they economic, political, social or environmental—in one world region can have immediate repercussions in another world region.

The continent of Africa is often in the news, though the coverage of political upheaval, famines, and droughts rarely conveys much understanding of the continent's complex geography and environment. The unfamiliarity of the names of African countries and cities, the recent period of colonial governance and the images that have been conveyed through films and television make it all the more important to provide students with a basic grounding in information about this region. This unit will offer a geographic introduction to the map of Africa, with a focus on sub-Saharan Africa in terms of its examples and information.

Unit Goals

- to teach students key geographical terms that are important for communicating geographical ideas
- to introduce and reinforce students' knowledge of the physical and political geography of Africa
- to teach students the interaction of climate, landform, and natural vegetation
- to improve students' understanding of location

- to develop and practice chart and map reading skills
- to provide opportunities for group work

Materials

- Overhead Projector
- Wall maps or atlases of Africa
- Textbooks

Time and Suggested Sequence of Activities

Each of the unit's five lessons can be integrated into your curriculum where it best suits your needs. However, we do recommend that you teach the entire unit as a whole. The following suggested sequence of activities will give you an idea of how the unit has been designed. While *Mapping Africa* teaches many important skills and ideas, the unit is not exhaustive.

- *Lesson One (suggested teaching time: 1 class period):*
  Through small group work, students will be introduced to key geographical terms that are important for communicating geographical ideas.

- *Lesson Two (suggested teaching time: 1 to 2 class periods):*
  This lesson focuses on the political geography of Africa. After locating and identifying the continent of Africa, students will be given map clues which they, in teams, should try to answer as quickly as possible.

- *Lesson Three (suggested teaching time: 1 class period):*
  Students continue their exploration of the physical geography of Africa. They will review the ways in which human and environmental interaction have affected the continent's ecology, and how specific geographic factors have impacted human societies.

- *Lesson Four (suggested teaching time: 1 class period):*
  As in lesson two, students will be given map hunt clues to answer, this time focusing on physiographic features of Africa. At the end of the activity, each student will label the physiographic feature on the class map.

- *Lesson Five (suggested teaching time: 1 to 2 class periods):*
  In this lesson, students will learn to use latitude and longitude to locate African capitals. By comparing the climates of certain locations in Africa, they will be able to understand how certain factors affect the climates of Africa.

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Curriculum Connections

Mapping Africa meets the guidelines for teaching geography that were adopted by the California State Board of Education in its Model Curriculum Standards for World History, Culture, and Geography.

A course should:

- develop the student's knowledge of physical and place-name geography and encourage relation of that knowledge to specific historical or contemporary events and conditions. Students should be encouraged to identify the major mountain ranges, arid regions, rivers, seas, islands, straits, etc., in order to show how they have affected the course of its history and development in various periods.

- emphasize the relationships among cultures, topography, climate, soils, etc., and historical development, notably the effect of specific geographical features, both negative and positive, on human communications and contact, and on economic productivity.

- provide opportunities for students to develop basic, creative, critical thinking, and interpersonal and social skills.

Mapping Africa also addresses the following themes as developed by the Association of American Geographers and the National Council for Geographic Education:

- *Location—Position on the Earth's Surface:*
  Absolute and relative location are two ways of describing the positions of people and places on the earth's surface.

- *Place—Physical and Human Characteristics:*
  All places on the earth have distinctive tangible and intangible characteristics that give them meaning and character and distinguish them from other places. Geographers generally describe places by their physical or human characteristics.

- *Relationships Within Places—Humans and Environments:*
  All places on the earth have advantages and disadvantages for human settlement.

- *Regions—How They Form and Change:*
  The basic unit of geographic study is the region, an area that displays unity in terms of selected criteria.

Icons

For easier reference the following icons are used throughout the unit:

Notes to the Teacher

Background Information

Homework

Small Group Activity

Student Card

Lesson One

GETTING ORIENTED TO GLOBES AND MAPS

Introduction

In this lesson students will learn the key geographical terms used throughout this unit that are important for communicating geographical ideas. These terms will be learned through verbal and visual thinking.

Objectives

- to define 24 geographical terms and identify an African example for each
- to locate on the world map:
  - the compass rose
  - the equator and tropics
  - the seven continents and four oceans
  - the Arctic and Antarctic circles

Materials

- An Overhead Projector
- Handout 1A, *Blank World Map,* one per group of 3-5 students
- Transparency 1A, *World Map—Answer Key*
- Transparency of Handout 1A, *Blank World Map,* see procedures
- Handout 1B, *List of Geographical Terms,* one per group of 3-5 students
- Transparency 1B, *List of Geographical Terms—Answer Key*

Time

Suggested teaching time for this lesson: 1 class period

Suggested Procedure

1. Distribute Handout 1A, *Blank World Map*, to the students. Write the following geographical terms on the board and tell them they have ten minutes to label these on their maps in pencil as accurately as possible:

   - the four directions
   - the prime meridian, equator, Tropic of Cancer, and Tropic of Capricorn
   - the seven continents
   - the four oceans
   - the Arctic and Antarctic circles

   Explain to the students that they are not to look in their atlases or books for assistance. This is simply a pre-test to find out what they need to learn.

2. After students have the opportunity to review their basic geography terms by consulting one another, project Transparency 1A, *World Map—Answer Key*. Or you may want to prepare a Transparency of Handout 1A, *Blank World Map*, and label the transparency step-by-step.

3. Divide the class into groups of three to five students and distribute a copy of Handout 1B, *List of Geographical Terms* to each group. Assign the students in each group the roles of recorder, facilitator and graphic artist. Ask each group to develop a definition for the geographical terms in the space provided without using dictionaries. Groups that finish early should begin to draw map illustrations in the appropriate space to represent the geographical term. If they know an African example of a geographic term they should write it down. Otherwise they should not write anything in that section.

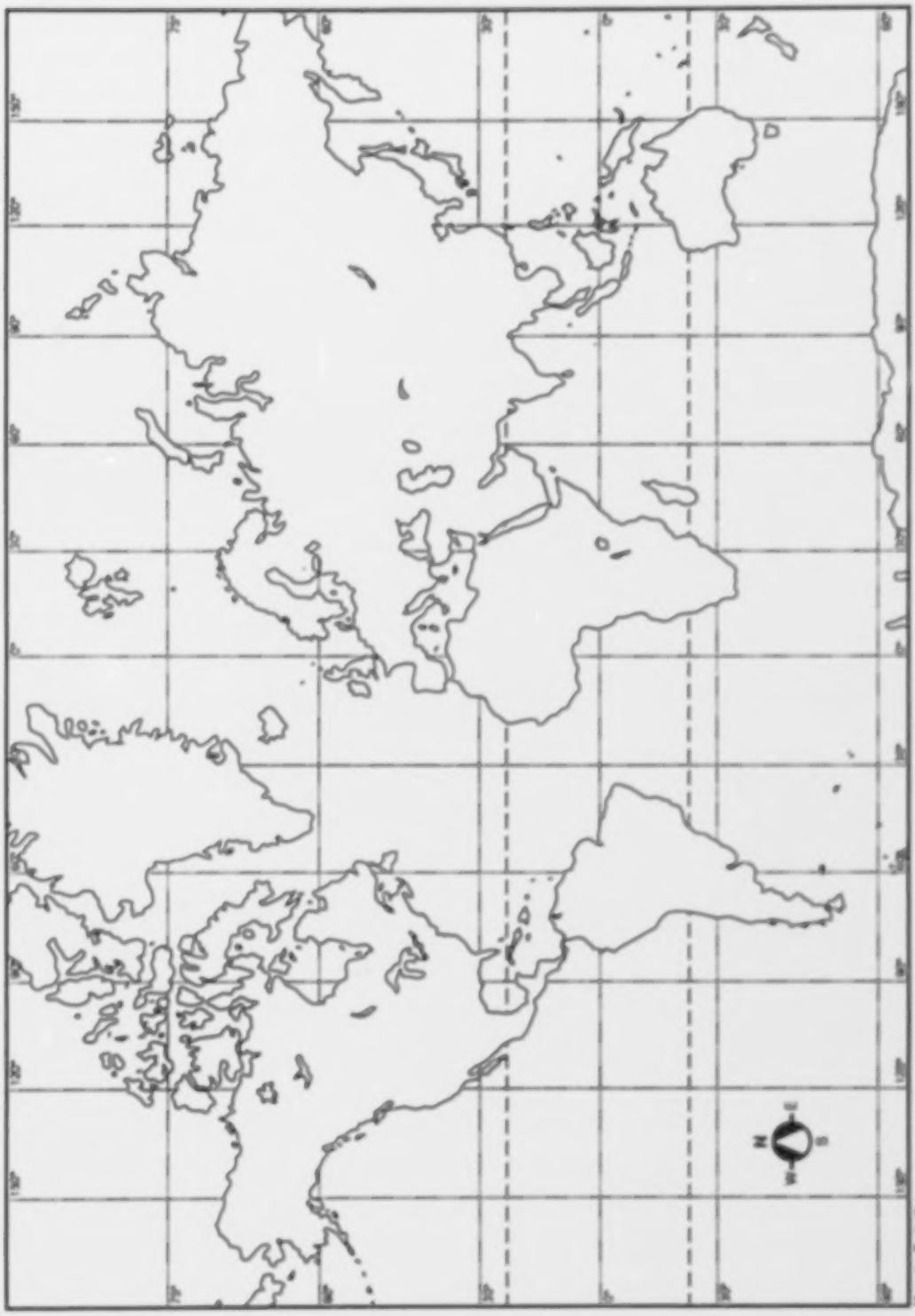
4. When students have finished their group work, reconvene the class and review their progress on defining the geographical terms. Project Transparency 1B, *List of Geographical Terms—Answer Key*. Cover the transparency and ask students, "what is your definition for archipelago?" After a brief discussion uncover the first term on the answer key. Have students write in the definition (if significantly different from the one their group has developed) and an African example. Continue this process until all terms have been completed.

5. Finally, if there is time, have students draw their illustrations for geographical terms on the board. There are at least two ways to do this: 1) you could identify a term (e.g. bay) and have each group draw their illustration of a bay. Then the class as a whole could vote on which is the best illustration; or 2) you could ask a group to draw an illustration without telling the class which term it is. Students should then guess which the term identifies.

Ask students to research magazines and newspapers for maps and articles about Africa. They will use these materials at a later point.

handout 1a

Blank World Map



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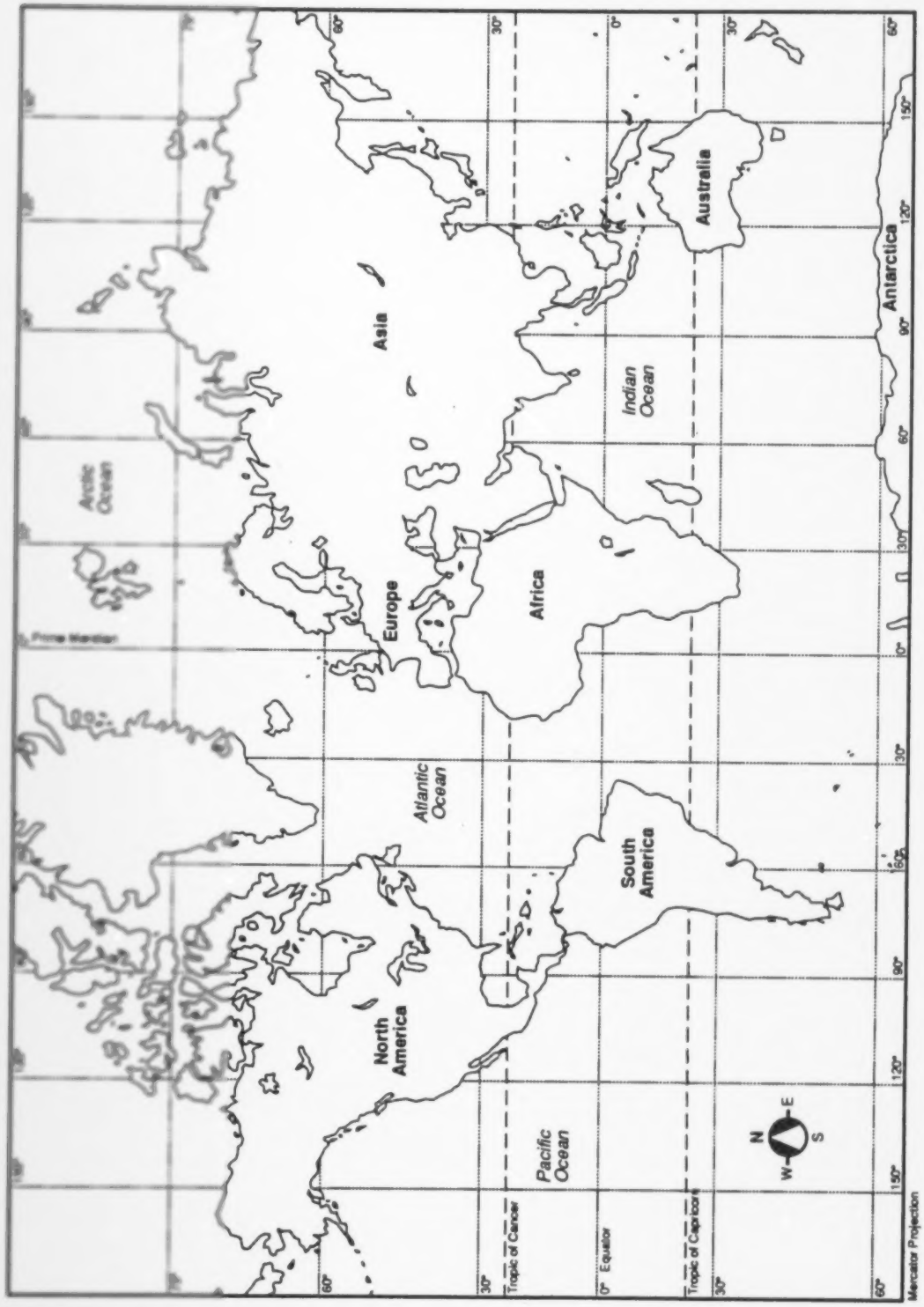
WORLD MAP—ANSWER KEY



LIST OF GEOGRAPHICAL TERMS

(1 of 2)

TERM	DEFINITION	EXAMPLE	ILLUSTRATION
archipelago			
bay			
canal			
cape			
channel			
delta			
desert			
gulf			
harbor			
island			
lagoon			
lake			

LIST OF GEOGRAPHICAL TERMS
(2 of 2)

TERM	DEFINITION	EXAMPLE	ILLUSTRATION
mountain			
mountain range			
ocean			
peninsula			
plain			
plateau			
river			
sea			
sound			
strait			
valley			
volcano			

LIST OF GEOGRAPHICAL TERMS—ANSWER KEY

(1 of 3)

TERM	DEFINITION	EXAMPLE
archipelago	a group of many islands	Comoros
bay	an inlet of the ocean or part of the ocean surrounded by land	Walvis Bay (Namibia)
canal	a human-made channel filled with water and used for navigation, irrigation, or drainage	Suez (Egypt)
cape	a narrow piece of land projecting into the sea	Cape of Good Hope (South Africa)
channel	the deepest part of a river, harbor, or strait where the main current runs	Mozambique Channel (Mozambique)
delta	deposits of earth at the mouth of a river	Niger Delta (Nigeria)
desert	a large area of land with little or no moisture or vegetation	Sahara (Niger, Mali, Algeria)
gulf	a large body of water bigger than a bay and surrounded on three sides by land	Gulf of Aden

LIST OF GEOGRAPHICAL TERMS—ANSWER KEY

(2 of 3)

TERM	DEFINITION	EXAMPLE
harbor	a sheltered body of water where ships anchor	Mombasa (Kenya)
island	an area of land surrounded by water	Zanzibar (Tanzania)
lagoon	a shallow area of salt water separated from the open sea by a bank, sandbar or reef	Abidjan (Ivory Coast)
lake	an inland body of water	Lake Victoria (Uganda)
mountain	a high elevation of the earth's surface	Mount Kilimanjaro (Tanzania)
mountain range	a series of connecting mountains	Fouta Djallon Mtns. (Guinea)
ocean	any one, or all, of the four largest connecting bodies of salt water on the earth's surface	Atlantic Ocean
peninsula	a piece of land surrounded on three sides by water	Somali Peninsula (Somalia)

LIST OF GEOGRAPHICAL TERMS—ANSWER KEY

(3 of 3)

TERM	DEFINITION	EXAMPLE
plain	a large flat piece of land	Serengeti Plain (Tanzania)
plateau	an elevated, level expanse of land	Bauchi Plateau (Nigeria)
river	a large stream of water of natural origin	Niger (Niger)
sea	a large body of water partly or nearly surrounded by land, smaller than an ocean	Red Sea
sound	a passage between the mainland and an island	Zanzibar Sound (Tanzania)
strait	narrow waterway connecting two larger bodies of water	Bab al Mandeb (Red Sea, Gulf of Aden)
valley	the land between hills or mountains usually containing a stream or a river	Rift Valley (Kenya)
volcano	a vent in the earth's crust through which molten material is erupted and is solidified forming a conical-shaped mountain	Mount Elgon (Uganda-Kenya)

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Lesson Two

COUNTRIES OF AFRICA

Introduction

This lesson focuses on the political geography of Africa. After locating and defining Africa, students will be given map hunt clues which they, in teams, should try to answer as quickly as possible.

Objectives

- to locate and define the continent of Africa
- to use an atlas to locate and label African countries and microstates
- to improve understanding of location
- to improve map reading skills
- to work together in groups on a common activity

Materials

- An Overhead Projector
- Atlases
- Handout 2A, *Blank Political Map of Africa*
- Transparency of Handout 2A, *Blank Political Map of Africa*, see procedures.
- Transparency 2A, *Political Map of Africa—Answer Key*, optional
- Handout 2B, *Political Map Hunt Clues*, one set per team
- Handout 2C, *Political Map Hunt—Answer Page*, one set per team
- Transparency 2B, *Political Map Hunt—Answer Key*
- Teacher's Guide 2A, *Political Map Hunt—Answer Key*

Time Suggested teaching time for this lesson: 1-2 class periods

Suggested Procedure

1. Ask students to define "Africa." What does it mean to be "African" (geographically, culturally, politically, religiously)? Do not point out individual countries to the students at this time. They will discover the names and locations of specific countries during the exercise explained below. Point out to students that when defining Africa as a *continent*, natural or physical boundaries are used.

2. Prepare and project the Transparency of Handout 2A, *Blank Political Map of Africa*. Remind students that this map represents boundaries that are, in many cases, less than forty years old. It is important to stress that these boundaries are arbitrary and not related to cultural boundaries, often resulting in boundary disputes. Most of these countries did not achieve political independence within their present boundaries until after 1950, many not until after 1960. The continent of Africa includes both what is referred to as "black" or sub-Saharan Africa, as well as north Africa.

3. Prepare the Political Map Hunt Clues (Handout 2B, *Political Map Hunt Clues*, one set per team) by copying Handout 2B and cutting out the clue cards along the dotted lines. Paste the clues onto index cards. One set of map hunt clues should be made for each team. You will be able to reuse the cards.

4. Divide your class into groups of four or five students. Distribute a set of clues and a copy of Handout 2C, *Political Map Hunt—Answer Page* to each group. Tell them that, as a team, they should try to find the answers to the clues as quickly as possible. The questions and answers should be written on the answer page. Each correct answer is worth one point; the team with the most correct answers can be declared the winner of the activity. (Students may ask if there can be more than one winner. The answer is yes—the correct answers are important, the speed at which a team arrives at these answers is inconsequential—but do not tell them this until debriefing. Simply repeat the directions.) Students should use their atlases or their textbooks to look for correct answers to the map hunt clues. Tell students that after every five minutes there will be a bargaining session. At this time teams cannot continue to work on answering map hunt clues, but can negotiate an exchange of answers with other teams. Each team is free to choose how to negotiate with other teams.

5. Each team should have members who take on the following roles: recorder, negotiator, and speaker. The recorder writes the answers on Handout 2C. The negotiator is responsible for communicating with other teams. Negotiators may leave their seats to meet with other

teams. Speakers are responsible for reading the answers from their worksheets to you while you check for errors. Other roles, such as encourager or harmonizer, timer, and group facilitator may be assigned if students are familiar with such roles.

6. Begin activity with a negotiating period of one minute. Students will probably not know how to effectively use this time period, but that is all right. The possibility that students will negotiate to work on different problems from the start must be allowed even though it may not happen. (In the debriefing session, raise the point that students could have divided up the chore from the beginning.) Next, alternate between work periods (five minutes) and negotiating periods (two minutes) until one team answers every question correctly. When teams decide they are finished, check their answers. If any team has some wrong answers, they should continue working on the questions.

7. Debrief the activity. For example, ask each team how they went about answering the questions and also how they used their negotiating periods.

8. Next, collect all clue cards and shuffle them. Distribute a copy of Handout 2A, *Blank Political Map of Africa*, to each student. Then give each student one clue and have him or her stand in front of the class, read the clue, give the answer (or look to team members for the answer), and point to the proper location on the Transparency of Handout 2A, *Blank Political Map of Africa* or a wall map. Students should then label their maps. Continue this procedure until all clues have been reviewed and labeled on the map. Ask them to keep their maps.

Help students sort out the geographical terminology used for certain regions, as well as name changes that may be confusing:

- North Africa usually includes Morocco, Tunisia, Libya, Algeria and Egypt (sometimes also Mauritania); in addition, there is a dispute over the governance of Western Sahara, which is presently occupied and claimed by Morocco;

- the Horn of Africa includes Ethiopia, Somalia, Djibouti, Sudan and Eritrea;

- South Africa is one country, while southern Africa is a region that includes Namibia, Botswana, Lesotho, Swaziland in some definitions, others would add Angola, Zambia, Zimbabwe and Mozambique;

- Eritrea is a newly independent country, achieving this in May 1993;

- Several country names have changed from older maps including:
  - Zimbabwe was Rhodesia
  - Zaire was Congo-Kinshasha
  - Namibia was Southwest Africa
  - Burkina Faso was Upper Volta
  - Benin was Dahomey

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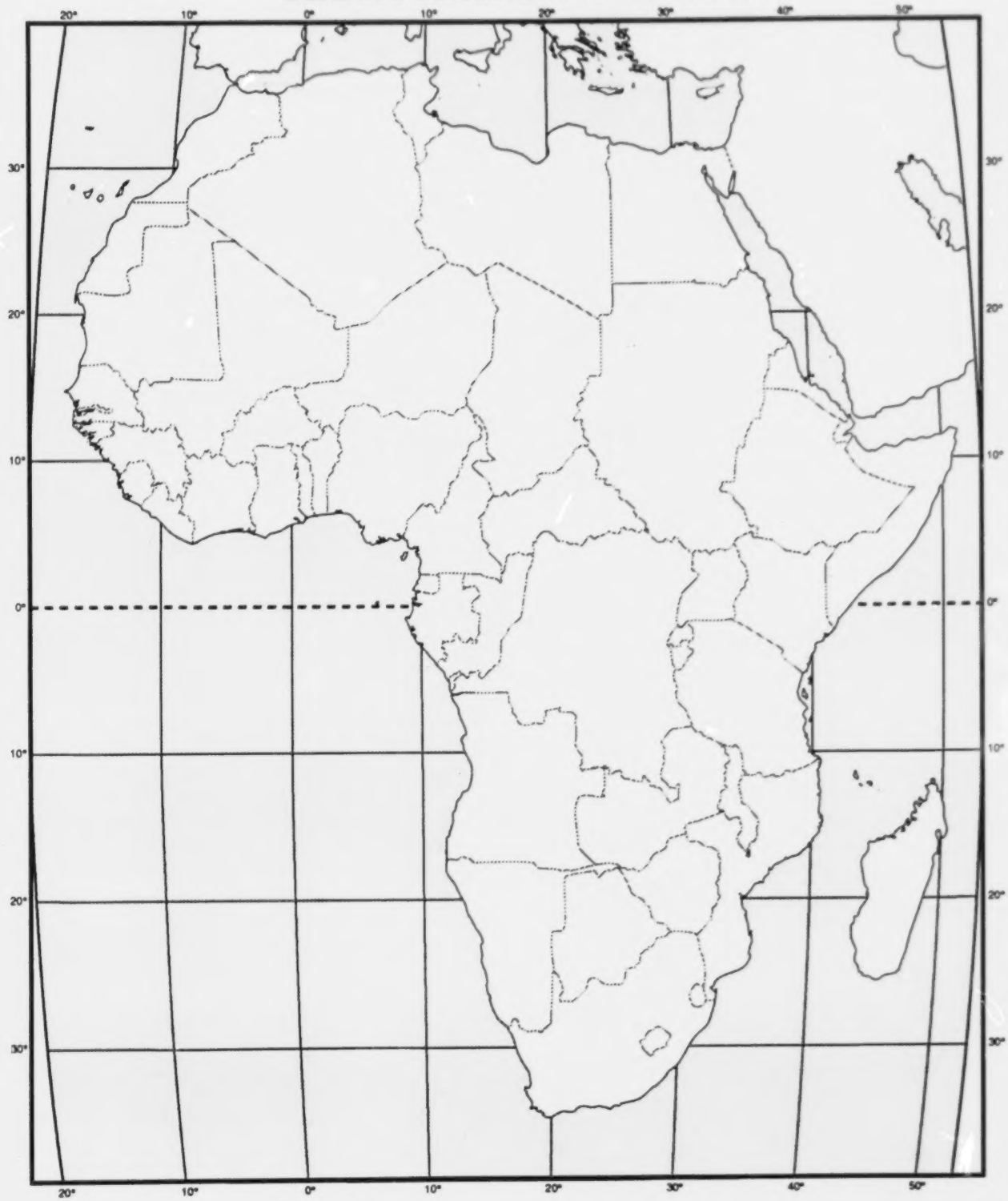
BLANK POLITICAL MAP OF AFRICA



POLITICAL MAP OF AFRICA—ANSWER KEY

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POLITICAL MAP HUNT CLUES (1 OF 3)

Please cut along the dotted lines and paste onto index cards of appropriate size.

1. What country in Africa lies farthest to the south?	2. What large central African country has only a narrow coastal outlet?
3. Several countries have a coastline on the Red Sea. Which one lies farther to the south?	4. The Niger River runs through several African countries. Which of these is the smallest?
5. One east African country consists of a mainland country and several islands. What is the name of the largest island?	6. Which two large countries in west Africa have nearly identical names?
7. Which small central African country consists of an island and a mainland region?	8. Which is the largest country in northeast Africa?
9. Which country has Nairobi for its capital?	10. What African country is bordered by three large lakes?

POLITICAL MAP HUNT CLUES (2 OF 3)

Please cut along the dotted lines and paste onto index cards of appropriate size.

11. What country is a large island on the Indian Ocean?	12. Which African country lies farthest to the west?
13. Which west African country has Accra for its capital?	14. What are two small landlocked countries in central Africa?
15. Four African countries begin with the letter B. Which one lies farthest south?	16. There are several landlocked countries in west Africa. Which is the farthest west?
17. What two <u>small</u> west African coastal countries share nearly identical names?	18. What newly independent African country borders the Red Sea?
19. Which African country has Harare for its capital?	20. Which African country is a group of small islands in the Indian Ocean?

POLITICAL MAP HUNT CLUES (3 OF 3)

Please cut along the dotted lines and paste onto index cards of appropriate size.

21. Name two landlocked countries in Africa that begin with the letter C.	22. Which African country has Luanda as its capital?
23. Name two small landlocked countries in southern Africa?	24. What countries contain the sources of the Nile?
25. Which African country has Libreville as its capital?	26. What southern African country recently became independent?
27. Name two landlocked neighbors of Zimbabwe?	28. Which country has Addis Ababa as its capital?
29. What is the smallest country bordering Nigeria?	30. What two countries border the Congo River?

POLITICAL MAP HUNT—ANSWER PAGE

Write the questions and answers to the Political Map Hunt Clues below. You don't have to write down the entire question, only enough to remember what the question is asking.

1. _____ 16. _____
2. _____ 17. _____
3. _____ 18. _____
4. _____ 19. _____
5. _____ 20. _____
6. _____ 21. _____
7. _____ 22. _____
8. _____ 23. _____
9. _____ 24. _____
10. _____ 25. _____
11. _____ 26. _____
12. _____ 27. _____
13. _____ 28. _____
14. _____ 29. _____
15. _____ 30. _____

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POLITICAL MAP HUNT—ANSWER KEY

1. South Africa
2. Zaire
3. Somalia
4. Guinea
5. Zanzibar
6. Niger and Nigeria
7. Equatorial Guinea
8. Sudan
9. Kenya
10. Tanzania
11. Madagascar
12. Senegal
13. Ghana
14. Rwanda and Burundi
15. Botswana
16. Mali
17. Guinea and Guinea-Bissau
18. Eritrea
19. Zimbabwe
20. Comoros
21. Chad and Central African Republic
22. Angola
23. Swaziland and Lesotho
24. Uganda and Ethiopia
25. Gabon
26. Namibia
27. Zambia and Botswana
28. Ethiopia
29. Benin
30. Zaire and Congo Republic

POLITICAL MAP HUNT—ANSWER KEY

(1 of 2)

1. What country in Africa lies farthest to the south? *(South Africa)*
2. What large central African country has only a narrow coastal outlet? *(Zaire)*
3. Several countries have a coastline on the Red Sea. Which one lies farther to the south? *(Somalia)*
4. The Niger River runs through several African countries. Which of these is the smallest? *(Guinea)*
5. One east African country consists of a mainland country and several islands. What is the name of the largest island? *(Zanzibar)*
6. Which two large countries in west Africa have nearly identical names? *(Niger, Nigeria)*
7. Which small central African country consists of an island and a mainland region? *(Equatorial Guinea)*
8. Which is the largest country in northeast Africa? *(Sudan)*
9. Which country has Nairobi for its capital? *(Kenya)*
10. What African country is bordered by three large lakes? *(Tanzania)*
11. What country is a large island on the Indian Ocean? *(Madagascar)*
12. Which African country lies farthest to the west? *(Senegal)*
13. Which west African country has Accra for its capital? *(Ghana)*
14. What are two small landlocked countries in central Africa? *(Ruanda, Burundi)*
15. Four African countries begin with the letter B. Which one lies farthest south? *(Botswana)*

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POLITICAL MAP HUNT—ANSWER KEY
(2 of 2)

16. There are several landlocked countries in west Africa. Which is the farthest west? *(Mali)*

17. What two small west African coastal countries share nearly identical names? *(Guinea and Guinea-Bissau)*

18. What newly independent African country borders the Red Sea? *(Eritrea)*

19. Which African country has Harare for its capital? *(Zimbabwe)*

20. Which African country is a group of small islands in the Indian Ocean? *(Comoros)*

21. Name two landlocked countries in Africa that begin with the letter C. *(Chad and Central African Republic)*

22. Which African country has Luanda as its capital? *(Angola)*

23. Name two small landlocked countries in southern Africa. *(Swaziland, Lesotho)*

24. What countries contain the sources of the Nile? *(Uganda, Ethiopia)*

25. Which African country has Libreville as its capital? *(Gabon)*

26. What southern African country recently became independent? *(Namibia)*

27. Name two landlocked neighbors of Zimbabwe. *(Zambia, Botswana)*

28. Which country has Addis Ababa as its capital? *(Ethiopia)*

29. What is the smallest country bordering Nigeria? *(Benin)*

30. What two countries border the Congo River? *(Zaire, Congo Republic)*

Lesson Three

HUMAN AND ENVIRONMENTAL INTERACTION IN AFRICA

Introduction

In this lesson students explore the ways in which the interaction between humans and their environment have shaped the nature of Africa today.

Objectives

- to become familiar with the environmental diversity of Africa
- to learn about human–environment interactions
- to improve map reading skills

Materials

- An Overhead Projector
- Textbooks and Atlases
- Teacher's Guide 3A, *Glossary*
- Handout 3A, *Three African Families*
- Handout 3B, *Map of African Ecological Zones*
- Transparency of Handout 3B, *Map of African Ecological Zones*, optional
- Handout 3C, *Human-Environment Interaction*

Time

Suggested teaching time for this lesson: 1 class period

Suggested Procedures

1. Introduce the students to the lesson by asking the students to recall the geographic terms that they studied in Lesson One. Indicate to the students that just as rivers and mountains create divisions geographically, so does the impact of climate. This lesson will help them understand how climate and geography affect how people live and the ways in which people organize their communities and economies.

2. Divide students into pairs or small groups and write the following terms on the board:
   - Climate
   - Ecological Zones
   - Agriculture
   - Pastoralism
   - Geographic Terrain

   In their pairs or small groups, have students define these terms and then list at least two examples of each term. Debrief this activity by recording their responses and their examples on the board. Please refer to Teacher's Guide 3A, *Glossary*, for definitions of these terms.

3. Tell students that human societies continually interact and shape their own communities in relation to their environments. This means that because climates are not fixed, human societies have changed their economies, their ways of making a living, and indeed their living sites many times in the course of history. Still in pairs or small groups, have them identify and discuss examples of environmental factors and their impact on human societies.

   To help the students in their groups, tell students that around Mt. Kenya and Mt. Kilimanjaro, people grow high quality coffee and corn on the same plot of land for many years, because the soil from volcanoes is especially rich. In contrast, farmers in the Sahel in west Africa must move their farms every few years because the near–desert soils are quite poor in nutrients for plants. After providing these examples, ask students to list reasons why environmental factors might be notable. Remind students that they are allowed to use their textbooks and their atlases. When students have finished their group work, reconvene the class and review the changes they listed.

4. Have the students in groups of three to five read Handout 3A, *Three African Families*, short stories about different African people and how their relationship with their environment has shaped their lives. Still in their groups, have students briefly determine commonalties and differences between the three using the chart provided.

5. Debrief this activity by distributing Handout 3B, *Map of African Ecological Zones*. Ask the students if they see where the people in the stories might live. Can they suggest why certain regions are wetter or drier than others? What are some of the reasons that might explain why there are different ecological zones in Africa?

6. Distribute a copy of Handout 3C, *Human-Environment Interactions*. Make sure that all the groups also have a copy of Handout 3A, *Three African Families*. Introduce this activity by describing how people have always interacted with their environment, from building of irrigation canals in dry land areas to including air conditioning in their homes and offices in order to live in hot climates.

7. As the students look at the map, remind students that there are other zones that help define human interaction with the environment. Two of the most common are natural boundaries and cultural boundaries.

   - **Natural Boundaries:**
     Mountains, lakes, rivers, and deserts are all natural boundaries, which keep people from moving easily from one place to another.

   - **Cultural Boundaries:**
     Cultural boundaries may lie along natural boundaries, but can also exist without them. They are based on cultural and ethnic differences such as language, religion, or traditions.

   Cultural boundaries both arise from human interaction with the environment and also help define how different societies choose to interact with the environment. Thus, cultural boundaries may separate farmers from herders, even though both groups live in the same ecological zone. Their ancestors chose different ways for living in the same or similar environmental setting.

   Ask the students to reflect on the natural boundaries that may influence the lives of Victoria, Mussa and Kwesi (from Handout 3A). What influence do they have? Could those natural boundaries create cultural boundaries?

8. Debrief this lesson by asking students to consider in what other African countries they might find the people discussed in Handout 3A. The students should work in groups and look at the maps that they have developed. They can share with the class their suggestions of where people with similar life situations might be found.

GLOSSARY

Climate	The average condition of the weather at a particular place as it occurs over a several year period, including such factors as rainfall, temperature, and wind.
Ecological Zones	A geographic area or region that supports similar forms of plant and animal life due to factors of climate and geographic terrain.
Agriculture	A way of living that involves working the soil to produce crops that are prepared for human use.
Pastoralism	A society based on raising livestock (cattle, sheep, goats) as the primary economic activity.
Geographic Terrain	The physical features (hills, valleys, mountains, rivers) of an area of land that provide particular characteristics.

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THREE AFRICAN FAMILIES

(1 of 2)

Victoria is a farmer in Zimbabwe. She is in her early forties and lives with her five children in an area with fairly good soils and somewhat dependable rainfall. The agricultural zone would be considered savanna with some trees and bush. Her husband works in the city for part of the year, so his help on the farm is infrequent. She is responsible for the daily management of the farm and does most of the work. She farms about four acres and has enough produce to sell some crops in the local market. In order to protect herself from the risk of crop failure, she mixes a variety of crops: several different types of maize/corn (with different growing seasons in case the rainfall is sporadic or poor), groundnuts, several types of beans, and many vegetables. She uses the beans and some of the vegetables as special crops that help maintain the ability of the soil to grow food in the future.

Mussa is a nomadic (moving from place to place) pastoralist in Niger. His herd migrates through part of the wide, dry area of west Africa known as the Sahel ("the edge"), which sweeps between the Sahara and the forests of west Africa. Mussa's family moves regularly with between five and ten other families looking for good grazing land and water. The lives of this community are centered on their animals—cattle, sheep and goats—who provide the milk, butter and cheese for eating and trading. When the family requires grains or vegetables, they trade with what is produced by the herd. Their apparently difficult life of living in tents and moving with the seasons is in practice an efficient way of living in an environment where the rainfall is unpredictable, the temperatures high, and the changes in the amount of grass for cattle often dramatic. For this nomadic family, and many others in Africa, their livestock is their wealth, just as to the farming family, their land is their most precious asset.

Kwesi lives in the rainforests of Zaire. He grows many types of crops in between the trees or in small clearings that he and his family make in the forest. The soil in the forest is very fragile, so it is difficult to grow crops such as maize/corn. It is easier to grow trees that can stand the heavy rains and which have roots deep into the earth. Kwesi grows vegetables such as sweet potatoes and yams which can stay in the ground until he needs them for his family. This helps to prevent decay in the very wet forest.

THREE AFRICAN FAMILIES

(2 of 2)

What are the attributes of each family's situation?

	Zimbabwe (Victoria)	**Niger** (Mussa)	**Zaire** (Kwesi)
climate:			
food:			
work:			
terrain:			

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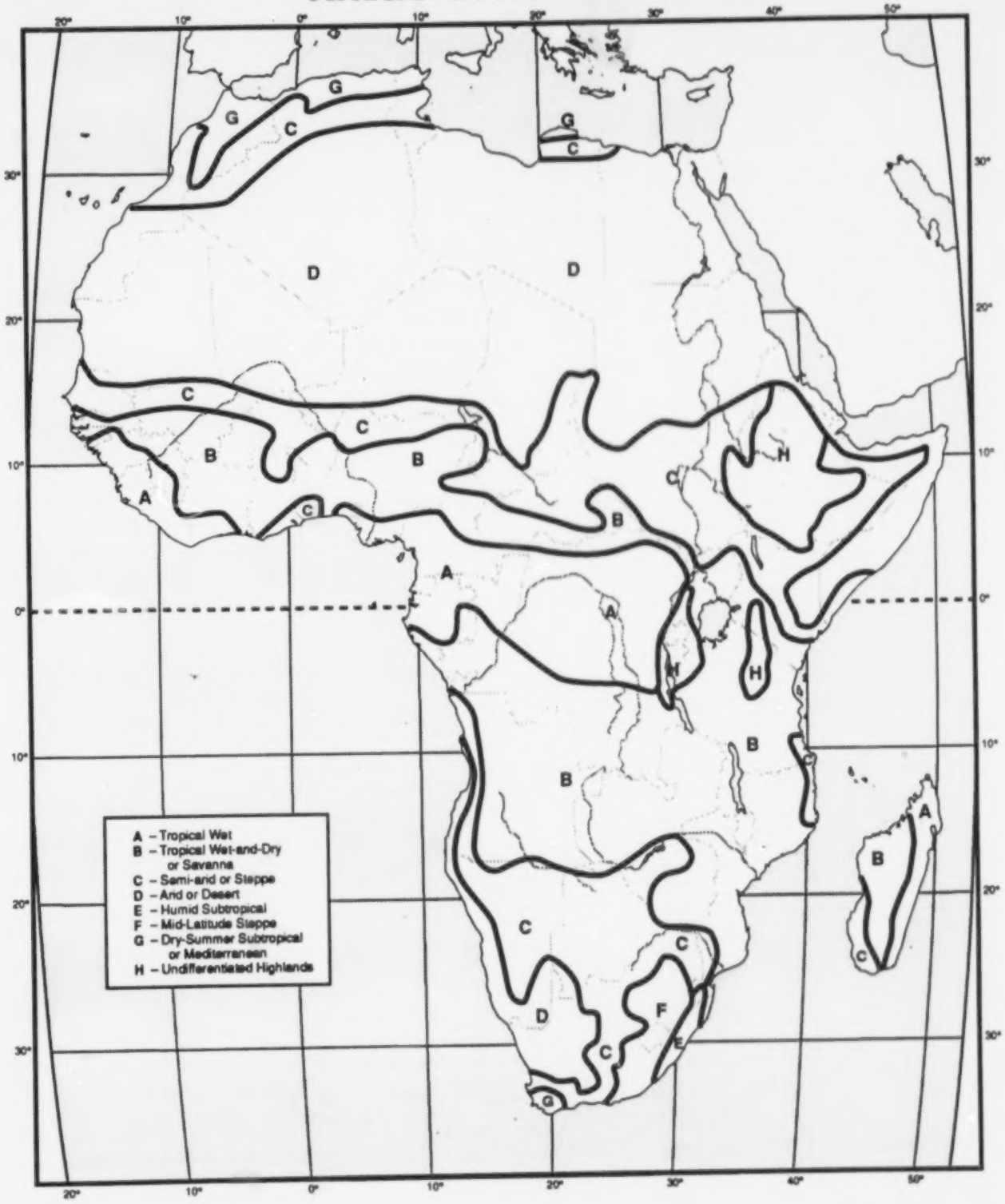
AFRICAN ECOLOGICAL ZONES


A – Tropical Wet
B – Tropical Wet-and-Dry or Savanna
C – Semi-arid or Steppe
D – Arid or Desert
E – Humid Subtropical
F – Mid-Latitude Steppe
G – Dry-Summer Subtropical or Mediterranean
H – Undifferentiated Highlands

HUMAN–ENVIRONMENT INTERACTIONS
(1 OF 2)

Human settlements and economic organization in Africa have been profoundly affected by the diversity of Africa's ecological zones and the ways in which people have interacted with their environments.

There are three major ecological zones in Africa:

forest: plant growth throughout the year
savanna: seasonal plant growth
deserts: brief and sporadic plant growth

In addition, there are four more specialized environmental zones:

coastal
lake
mountain
river

The latter four can be found in any of the three primary zones, resulting in more complex relationships and social organizations. In the areas around rivers, lakes and oceans, families will often spend part of their time fishing, especially during the dry season. There may also be certain families or communities that make their living by fishing and then trading regularly with both farmers and herders. Mountain regions are sometimes particularly valued because their soil may be better and the climate more temperate than in lower elevations. Farmers will plant a different mix of crops in mountainous regions, so that their fields will be quite different from other farmers only a few miles away. The most important factor in determining the differences between the ecological zones is the variation in climate, especially the amount and distribution of rainfall.

One other important difference to note in Africa is that there are key variations between climate and ecological zones between east and west Africa. This is due primarily to the presence of mountain ranges in east Africa which make for a more complicated pattern of rainfall and temperature than exists in west Africa. It is a good example of how the physical environment relates to climate conditions.

Africa is the most rural continent in the world. Even with extensive migration from rural areas to cities in the past two decades, a greater percentage of Africans live in rural areas than anywhere else. In addition, a significant proportion of people who reside in urban areas still maintain ties to villages.

The primary interaction between people and their environment in Africa is the way in which food is produced. Agriculture involves people working with the natural environment to utilize living or biological processes to produce food and raw materials for home use or sale.

HUMAN—ENVIRONMENT INTERACTIONS

(2 OF 2)

The natural environment involves the interrelationships of sunlight and heat, soil, water, vegetation and wildlife. Africans have developed farming systems that attempt to work within the environmental setting in which they live. Among the primary ways in which they gain food and resources from the land are:

1. Pastoralism: This way of life is centered around the raising of livestock, usually cattle, but sometimes sheep and goats. Pastoralists move their herds during the year to take advantage of different grazing areas and the presence of water during different seasons.

2. Rotational fallow cultivation: This method is similar to shifting cultivation, as farmers work a plot of land for three to five years. Instead of moving their families, however, they then farm another nearby plot of land for another period of time. They will continue to do this until the original plot has regained its fertility.

3. Permanent cultivation: This approach requires using the same plot of farm land continuously. Farmers either use manure collected from animals or purchased. Although "shifting cultivation" was once very common (farmers moved from plot to plot every three to five years when soil fertility diminished), this occurs less frequently today due to increased pressure on land use.

Activity

Choose some aspect of human-environment interaction in Africa and produce a poster or mural that illustrates this relationship.

Lesson Four

LEARNING THE PHYSIOGRAPHIC FEATURES OF AFRICA

Introduction

In this lesson students will label 30 physiographic features of Africa on blank maps of Africa using a set of map hunt clues. At the end of the activity each student will answer one clue in front of the class and label the physiographic feature on the class map.

Objectives

- to use an atlas to locate and label 30 physiographic features of Africa
- to improve their map-reading skills
- to work together in small groups on a common activity

Materials

- An Overhead Projector
- Atlases
- Handout 4A, *Blank Physiographic Map of Africa*
- Transparency of Handout 4A, *Blank Physiographic Map of Africa*, see procedures.
- Transparency 4A, *Physiographic Map of Africa—Answer Key*
- Handout 4B, *Physiographic Map Hunt Clues*
- Handout 4C, *Physiographic Map Hunt—Answer Page*
- Transparency 4B: Physiographic Map Hunt—*Answer Key*
- Teacher's Guide 4A, *Physiographic Map Hunt—Answer Key*

Time

Suggested teaching time for this lesson: 1 class period

Suggested Procedure

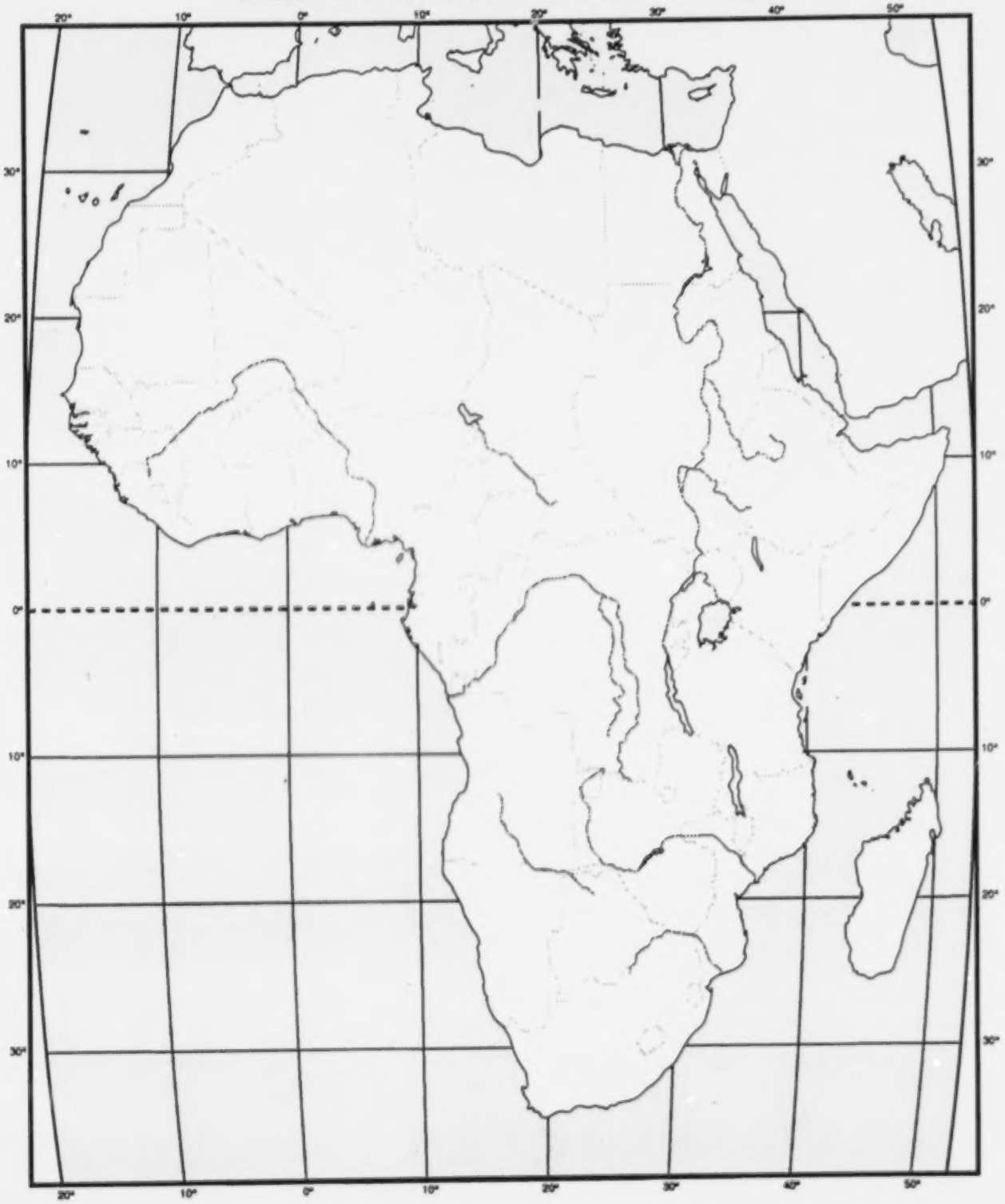
1. Begin the lesson by putting the words "physiographic feature" on the board. Ask students if they can define the words and tell you what the concept means. Explain that "physio" means physical; "graphic" means writing something down or recording it; and "feature" is a particular characteristic of something. Thus a "physiographic feature" is a physical feature of the land such as a lake, mountain, or river recorded on a map. Tell students that they will now be learning the major physiographic features of Africa.

2. Prepare *Physiographic Map Hunt Clues* (Handout 4B) by cutting out the cards along the dotted line and pasting them onto index cards. You will be able to reuse the cards, and you may want to laminate them for additional durability. Prepare a transparency of Handout 4A, *Blank Physiographic Map of Africa.*

3. Divide the class into pairs and provide each group with a copy of Handout 4A, *Blank Physiographic Map of Africa*, and an atlas opened to a physical map of Africa. Give each student a different map hunt clue and ask the students to find the answers to the questions by using the atlas. The questions and answers should be written on a copy of Handout 4C, *Physiographic Map Hunt—Answer Page.* Next, students should label and draw the physiographic features on their maps. Finally, students should swap clues and continue the exercise. After going through this process three or four times, students should go to the teacher and have their work corrected. If students have answered a question incorrectly they should try again. The activity should continue until each group has completed all 30 map hunt clues.

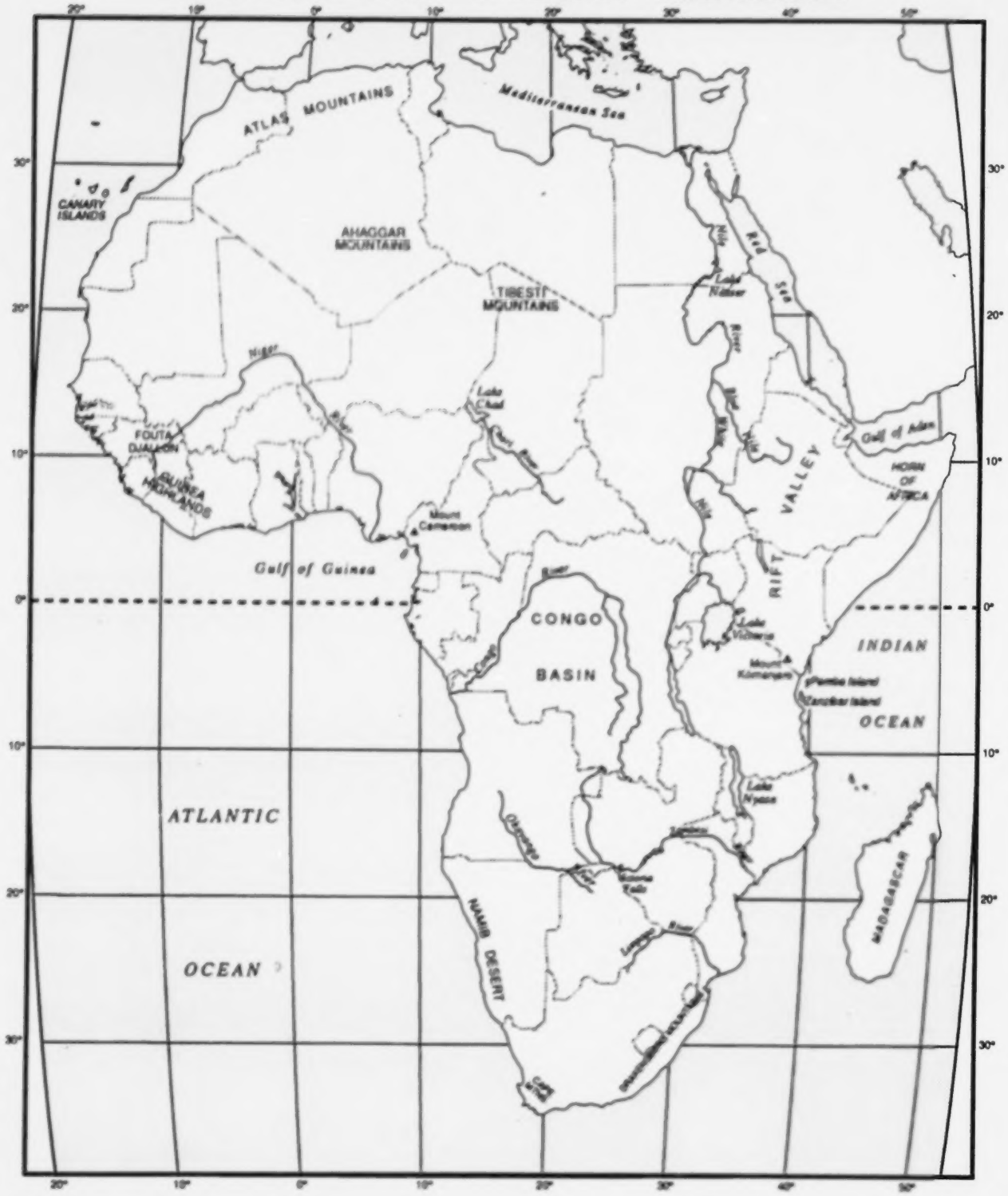
4. When all students are finished, collect the map hunt clues, shuffle them, and distribute one map hunt clue to each students. Ask students to come to the front of the class, read their clues, and by using their finished maps, label the overhead transparency of Handout 4A, *Blank Physiographic Map of Africa*, with the correct physiographic feature. Be sure the students are as accurate as possible when they draw the map symbols so that the entire class can check the accuracy of their maps. Continue this procedures until all physiographic features have been reviewed and are labeled on the transparency. Transparency 4A, *Physiographic Map of Africa—Answer Key*, and a transparency of Teacher's Guide 4A, *Physiographic Map Hunt —Answer Key*, can be used alternatively for debriefing.

BLANK PHYSIOGRAPHIC MAP OF AFRICA



transparency 4a

PHYSIOGRAPHIC MAP OF AFRICA—ANSWER KEY



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PHYSIOGRAPHIC MAP HUNT CLUES (1 OF 3)

Please cut along the dotted lines and paste onto index cards of appropriate size.

1. What plateau separates the west African coast from the Sahel?	2. What is the name of the sea bordered by Egypt and Ethiopia?
3. Which river in southern Africa has no outlet to any sea or lake?	4. What is the name of the gulf which lies between Yemen and Somalia?
5. What is the name of Africa's longest river?	6. What are the highlands in west Africa called?
7. What is the name of the great falls in Zimbabwe?	8. What is the name of the great basin in central Africa?
9. What is the name of the sea that separates Africa from Europe?	10. What is the name of the river that feeds into Lake Chad?

PHYSIOGRAPHIC MAP HUNT CLUES (2 OF 3)

Please cut along the dotted lines and paste onto index cards of appropriate size.

11. What valley extends from Ethiopia into Tanzania?	12. What is the name of the region containing Somalia and Ethiopia?
13. What is the name of the largest lake in east Africa?	14. What is the name of the lake that borders Malawi, Tanzania, and Mozambique?
15. What are the mountain ranges in the Sahara?	16. What is the river that forms part of the boundary between the Congo Republic and Zaire?
17. What are the names of the two rivers that form the Nile?	18. What is the name of the highest mountain in Tanzania?
19. What are the names of the oceans that border Africa?	20. What is the name of the desert on the southwest African coast?

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PHYSIOGRAPHIC MAP HUNT CLUES (3 OF 3)

Please cut along the dotted lines and paste onto index cards of appropriate size.

21. Which river runs from the Fouta Djallon through Mali, Niger and Nigeria and into the Atlantic Ocean?	22. What is the name of the large lake south of the Sahara in central Africa?
23. What small islands are located off the coast of Morocco?	24. Which large island is located in the Indian Ocean off the coast of Mozambique?
25. What are the two mountain ranges in South Africa?	26. What is the name of the lake on the Nile River formed by the Aswan Dam?
27. What are the two islands off the coast of Tanzania?	28. What are two rivers that flow through Mozambique?
29. What is the name of a large mountain in west central Africa?	30. What is the name of the gulf off the coast of Nigeria?

PHYSIOGRAPHIC MAP HUNT—ANSWER PAGE

Write the questions and answers to the Physiographic Map Hunt Clues below. You don't have to write down the entire question, only enough to remember what the question is asking.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____
29. _____
30. _____

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PHYSIOGRAPHIC MAP HUNT—ANSWER KEY

1. Fouta Djallon
2. Red Sea
3. Okavango River
4. Gulf of Aden
5. Nile River
6. Guinea Highlands
7. Victoria Falls
8. Congo Basin
9. Mediterranean Sea
10. Chari River
11. Rift Valley
12. Horn of Africa
13. Lake Victoria
14. Lake Nyasa
15. Ahaggar, Tibesti
16. Congo River
17. Blue Nile, White Nile
18. Kilimanjaro
19. Atlantic Ocean, Indian Ocean
20. Namib Desert
21. Niger River
22. Lake Chad
23. Canary Islands
24. Madagascar
25. Drakensberg, Cape
26. Lake Nasser
27. Zanzibar, Pemba
28. Limpopo, Zambezi
29. Mount Cameroon
30. Gulf of Guinea

PHYSIOGRAPHIC MAP HUNT—ANSWER KEY

(1 of 2)

1. Which plateau separates the west African coast from the Sahel? *(Fouta Djallon)*
2. What is the name of the sea bordered by Egypt and Ethiopia? *(Red Sea)*
3. Which river in southern Africa has no outlet to any sea or lake? *(Okavango River)*
4. What is the name of the gulf which lies between Yemen and Somalia? *(Gulf of Aden)*
5. What is the name of Africa's longest river? *(Nile River)*
6. What are the highlands in west Africa called? *(Guinea Highlands)*
7. What is the name of the great falls in Zimbabwe? *(Victoria Falls)*
8. What is the name of the great basin in central Africa? *(Congo Basin)*
9. What is the name of the sea that separates Africa from Europe? *(Mediterranean Sea)*
10. What is the name of the river that feeds into Lake Chad *(Chari River)*
11. What valley extends from Ethiopia into Tanzania? *(Rift Valley)*
12. What is the name of the region containing Somalia and Ethiopia? *(Horn of Africa)*
13. What is the name of the largest lake in east Africa? *(Lake Victoria)*
14. What is the name of the lake that borders Malawi, Tanzania and Mozambique? *(Lake Nyasa)*
15. What are the mountain ranges in the Sahara? *(Ahaggar, Tibesti)*

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PHYSIOGRAPHIC MAP HUNT—ANSWER KEY

(2 of 2)

16. What is the river that forms part of the boundary between the Congo Republic and Zaire? *(Congo River)*

17. What are the names of the two rivers that form the Nile? *(Blue Nile and White Nile)*

18. What is the name of the highest mountain in Tanzania? *(Kilimanjaro)*

19. What are the names of the oceans that border Africa? *(Atlantic Ocean, Indian Ocean)*

20. What is the name of the desert on the southwest African coast? *(Namib Desert)*

21. Which river runs from the Fouta Djallon through Mali, Niger and Nigeria and into the Atlantic Ocean? *(Niger River)*

22. What is the name of the large lake south of the Sahara in central Africa? *(Lake Chad)*

23. What small islands are located off the coast of Morocco? *(Canary)*

24. Which large island is located in the Indian Ocean off the coast of Mozambique? *(Madagascar)*

25. What are the two mountain ranges in South Africa? *(Drakensberg, Cape)*

26. What is the name of the lake on the Nile River formed by the Aswan Dam? *(Lake Nasser)*

27. What are two islands off the coast of Tanzania? *(Zanzibar, Pemba)*

28. What are two rivers that flow through Mozambique? *(Limpopo, Zambezi)*

29. What is the name of a large mountain in west central Africa? *(Mount Cameroon)*

30. What is the name of the gulf off the coast of Nigeria? *(Gulf of Guinea)*

Lesson Five

AFRICAN CLIMATE

Introduction

The lesson defines climate and examines the various factors that cause and affect climate. Latitude, winds, ocean currents, altitude, precipitation and proximity to land and water are also considered. The lesson is broken down into two parts and can be completed in two separate class periods, and concludes with an activity in which students create a map of Africa.

Objectives

- to use latitude and longitude to map Africa's capital cities
- to identify major determinants of climate in Africa
- to examine the relationships between latitude, longitude and climate
- to gain insight into the interaction of climate, land forms and natural vegetation

Materials

- An Overhead Projector
- Atlases and Wall Map of Africa
- Handout 5A, *A Selection of Capitals and Climates of Africa*, per group
- Teacher's Guide 5A, *A Selection of Capitals and Climates of Africa—Answer Key*
- Handout 5B, *Political Map of Africa*
- Handout 5C, *Map of Precipitation*, per group
- Handout 5D, *Map of Climates*, per group
- Handout 5E, *Intertropical Convergence Zone*

Time

Suggested teaching time for this lesson: 1 to 2 class periods

PART ONE: MAPPING AFRICA'S CAPITAL CITIES USING LATITUDE AND LONGITUDE

Suggested Procedure

1. Explain that guidelines are drawn around the globe running east and west. They are all parallel to the equator. These lines are called parallels of latitude. They are used to measure distances north and south of the equator. The equator is 0 degrees latitude. The North Pole is 90 degrees north latitude and the South Pole is 90 degrees south latitude.

2. Explain that guidelines are also drawn on the globe running north and south. These lines are called lines of longitude. They are used to measure distances east and west around the globe. Longitude is measured in 30 degree segments. The prime meridian is 0 degrees. It runs through part of England and Africa. The international dateline is 180 degrees east of the prime meridian; 180 degrees west is also the international dateline. There are 360 degrees around the entire world.

3. Explain that every point on the earth's surface has both a parallel of latitude and a line of longitude. For example, Dakar, Senegal, is located 14.4 degrees north latitude and 17.3 degrees west longitude; Maputo, Mozambique, is located at 25.6 degrees south latitude and 32.3 degrees east longitude.

4. Explain that if you know the latitude and longitude of any point on the earth's surface, you will be able to locate it on a map.

5. Divide students in pairs or small groups, and distribute a copy of Handout 5A, *A Selection of Capitals and Climates of Africa*, and Handout 5B, *Political Map of Africa*, to each group. Have students use latitude and longitude to locate African capitals and their respective countries on their maps and have them list the capitals and countries on Handout 5A.

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PART TWO: MAPPING AFRICA'S CLIMATES

Suggested Procedure

1. Explain that there are many factors which affect climate. The most important factor is the earth's position in relation to the sun. Point out that latitude or the distance from the equator affects the climate. The earth's tilt on its axis (23.5 degrees) affects the distribution of heat and light. The parts of the earth tilted away from the sun receive less heat and light. These are the parts closest to the North Pole (90 degrees north latitude) and the South Pole (90 degrees south latitude). The parts tilted towards the sun receive more heat and light. These are the parts that are close to the equator (0 degrees latitude).

2. Write the following on the board as you explain that there are other factors that act to moderate the influence of latitude on climate:

   - Altitude
   - Ocean Currents
   - Wind Currents
   - Proximity to Land and Water
   - Precipitation

   Explain that none of these factors works alone, but rather in combination with one another. The moderating factors may themselves be influenced by physiographic features such as mountains. Briefly review how each factor affects climate:

- Temperature falls 3.6 degrees Fahrenheit (2.0 degrees Celsius) for each thousand feet of altitude.

- Cold or warm ocean and wind currents cool or warm the lands they pass by.

- Large bodies of water warm up and cool down more slowly than land. The warm or cool air over the water blows onto the land, raising or lowering the air temperature.

- The amount of moisture in the air or precipitation, such as rain or snow, is as important as temperature in determining climate, land use, and lifestyle.

3. Explain that there is a wide range of climates within Africa. To demonstrate the impact of altitude on climate in Africa, contrast the climate in a highlands region with that of a city closer to sea level. Ask a student to locate Nairobi, Kenya, with that of Brazzaville, Congo Republic. Note that although they are at similar latitudes (Nairobi is at 1.2S and Brazzaville is at 4.2S), their altitudes are very different. (Nairobi's altitude is 5,971 ft./1820 m. and Brazzaville's altitude is 951 ft./290 m.). As a result, their average temperatures

vary notably, with Nairobi at an average of °64 F/°18 C and Brazzaville at an average of °76.3 F/°24.6 C.

4. Tell students that the Intertropical Convergence Zone (ITC) shapes the climate and rainfall patterns in Africa. The ITC (Handout 5E) shapes the climate of Africa because the continent is divided by the equator, meaning that its seasons are shaped by the wind patterns of the earth's rotation.

5. There is a notable difference between east and west Africa, due to the presence of higher mountains and mountain ranges in east Africa. This is apparent on the physiographic map that they have from Lesson 4. The mountains create a different climate mixture in east Africa than that which occurs in west Africa, even though the patterns of the ITC are the same.

6. Using Handout 5A, *A Selection of Capitals and Climates of Africa* have students work in pairs or small groups. Their task is to determine which of the factors—latitude, precipitation or altitude—is most important in determining the temperature for that city. Students should consult wall maps and atlases. When the activity is completed, discuss each city. In some cases it will be difficult to isolate a single responsible factor, which illustrates how all of these elements work together to produce climate.

7. With students still in pairs or small groups, distribute copies of Handout 5C, *Map of Precipitation*, and Handout 5D, *Map of Climates*. Students should refer to an atlas or text to fill in maps coloring each type of climate or level of precipitation with a different color. Students should then locate all the cities and physical features discussed in this unit on these maps.

8. To debrief this unit, have the students review Handout 5E, *Intertropical Convergence Zone* and identify three cities or countries that appear to be particularly affected by the zone's flow. Then ask students to select one city as a site for a business trip. What would be the best time of year to visit? What would the city's climate be like? What would they want to know about the city before visiting? This exercise can help serve as a conclusion for the Mapping Africa work, as the students again work with the political boundaries, city locations and climatic zones of the continent.

A Selection of Capitals and Climates of Africa[2]

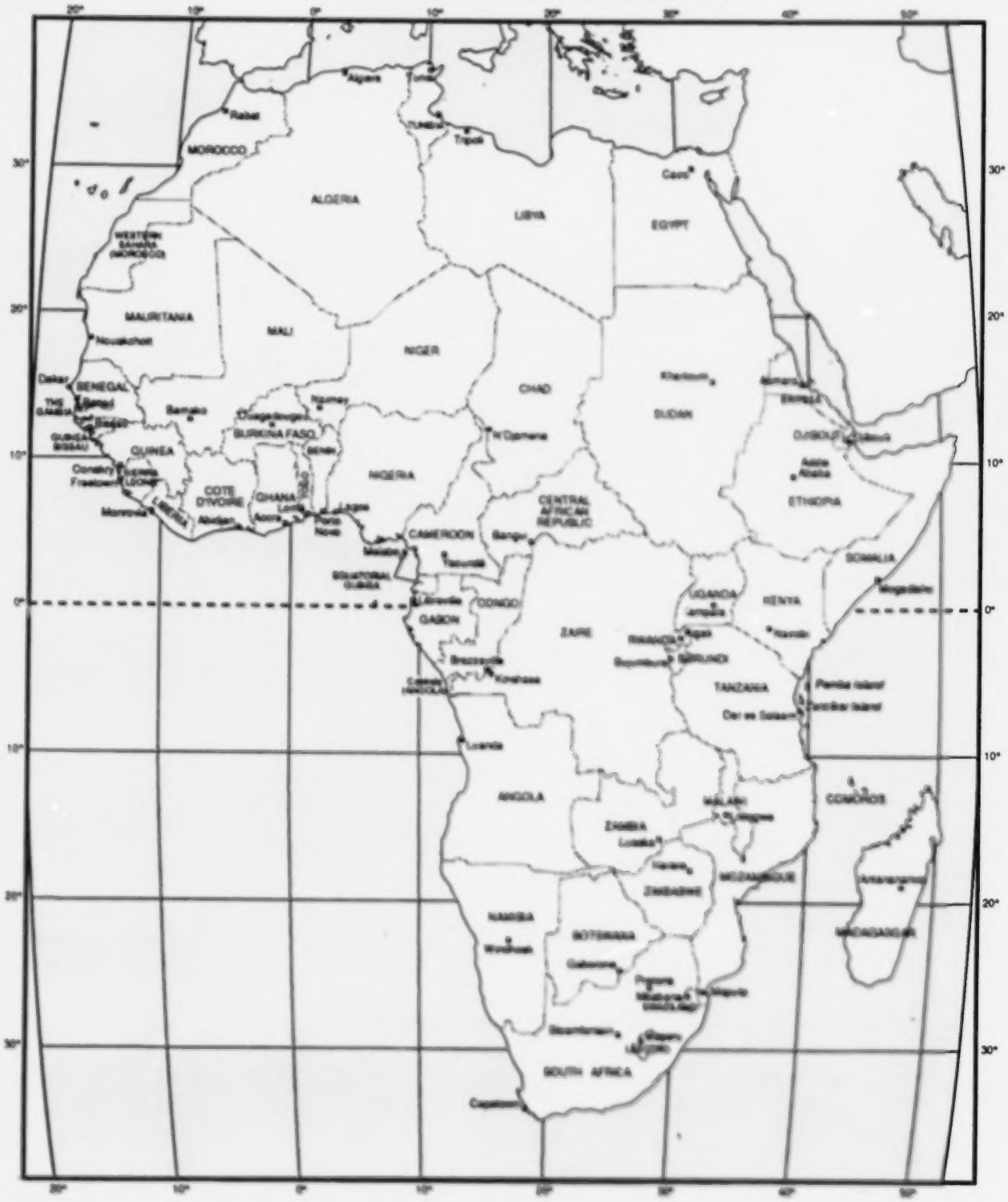
Use the latitudes and longitudes on this list to locate African capitals. Fill in the blank spaces with the names of the capitals and their countries.

Latitude	Longitude	Capital	Country	Annual Precipitation (in./mm)	Mean Temperature (°F/°C)	Altitude (ft./m.)
14.4N	17.3W			22.8/578	75.7/24.3	79/24
5.2N	4.0W			84.4/2144	79.7/26.5	23/7
12.4N	7.6W			43.3/1099	82.6/28.1	1089/322
13.3N	2.1E			25/636	84.0/28.9	728/222
3.5N	11.3E			65.4/1660	74.1/23.4	2493/760
15.4N	32.3E			6.5/164	83.7/28.7	1276/389
9.0N	38.4E			43.7/1109	63.0/17.2	7898/2408
2.0N	45.2E			16.6/421	81.1/27.3	33/10
0.2S	32.3E			47.2/1200	71.6/22.0	4303/1312
4.2S	15.2E			54.7/1390	76.3/24.6	951/290
0.3N	9.3E			122.8/3120	78.8/26.0	33/10
4.2S	15.2E			54.7/1390	76.3/24.6	951/290
8.5S	13.1E			14.4/367	75.6/24.2	141/43
15.3S	28.2E			32.1/816	68.9/20.5	4195/1279
17.5S	31.0E			35.3/897	65.7/18.7	4828/1472

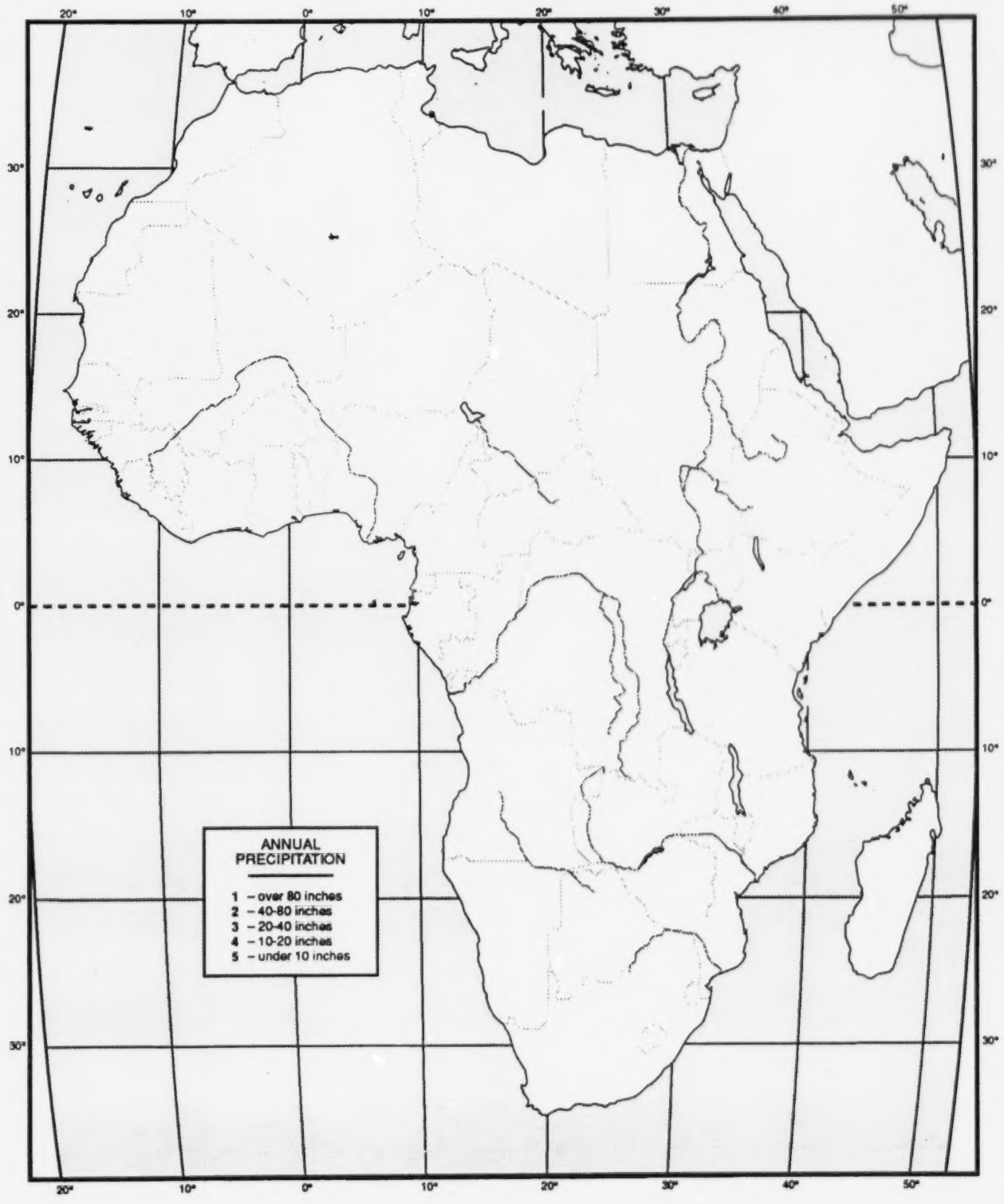
A Selection of Capitals and Climates of Africa—Answer Key

Latitude	Longitude	Capital	Country	Annual Precipitation (in./mm)	Mean Temperature (°F/°C)	Altitude (ft./m.)
14.4N	17.3W	Dakar	Senegal	22.8/578	75.7/24.3	79/24
5.2N	4.0W	Abidjan	Cote d'Ivoire	84.4/2144	79.7/26.5	23/7
12.4N	7.6W	Bamako	Mali	43.3/1099	82.6/28.1	1089/322
13.3N	2.1E	Niamey	Niger	25/636	84.0/28.9	728/222
3.5N	11.3E	Yaoundé	Cameroon	65.4/1660	74.1/23.4	2493/760
15.4N	32.3E	Khartoum	Sudan	6.5/164	83.7/28.7	1276/389
9.0N	38.4E	Addis Ababa	Ethiopia	43.7/1109	63.0/17.2	7898/2408
2.0N	45.2E	Mogadishu	Somalia	16.6/421	81.1/27.3	33/10
0.2S	32.3E	Kampala	Uganda	47.2/1200	71.6/22.0	4303/1312
4.2S	15.2E	Kinshasa	Zaire	54.7/1390	76.3/24.6	951/290
0.3N	9.3E	Libreville	Gabon	122.8/3120	78.8/26.0	33/10
4.2S	15.2E	Brazzaville	Congo	54.7/1390	76.3/24.6	951/290
8.5S	13.1E	Luanda	Angola	14.4/367	75.6/24.2	141/43
15.3S	28.2E	Lusaka	Zambia	32.1/816	68.9/20.5	4195/1279
17.5S	31.0E	Harare	Zimbabwe	35.3/897	65.7/18.7	4828/1472

POLITICAL MAP OF AFRICA



MAP OF PRECIPITATION



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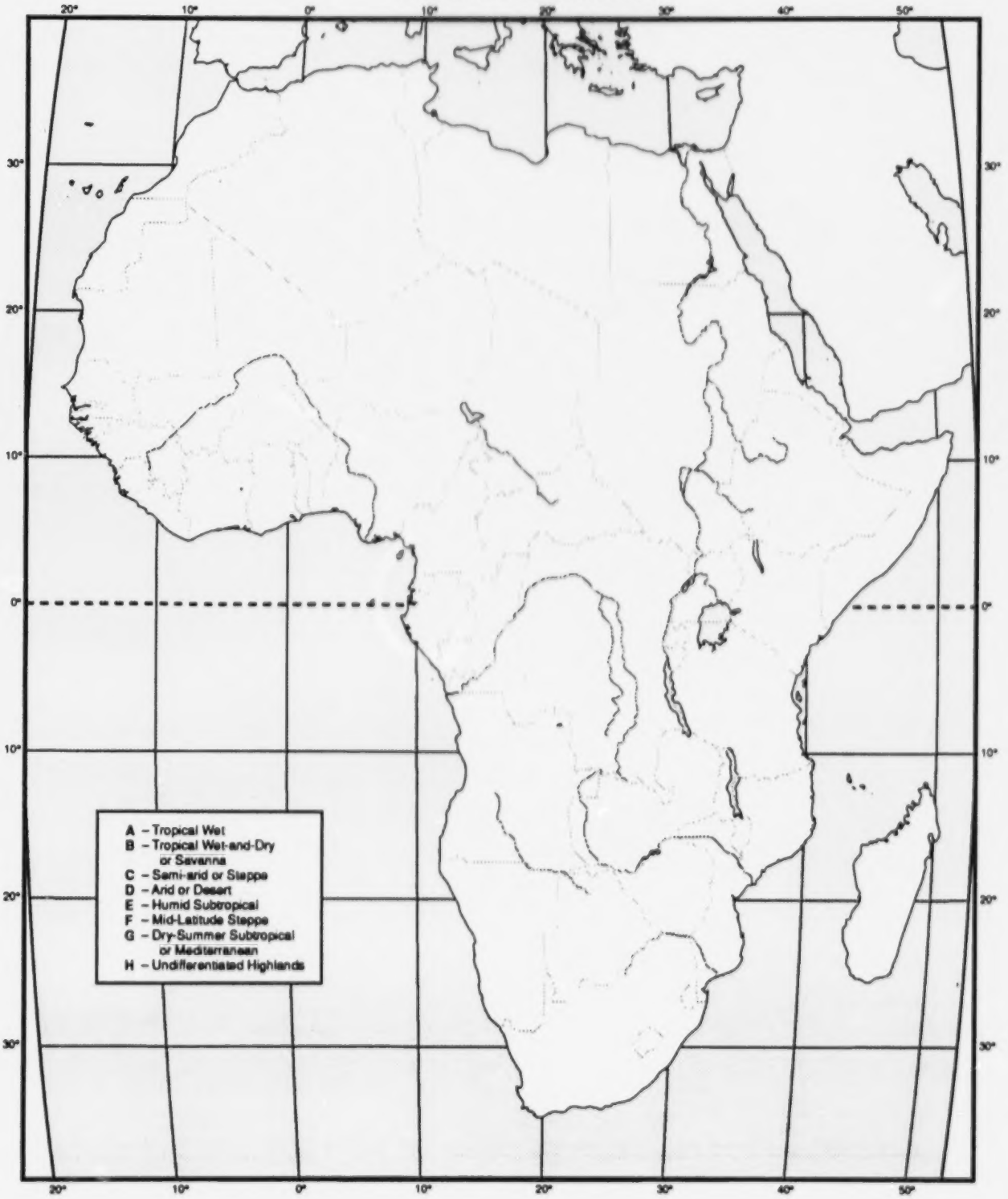
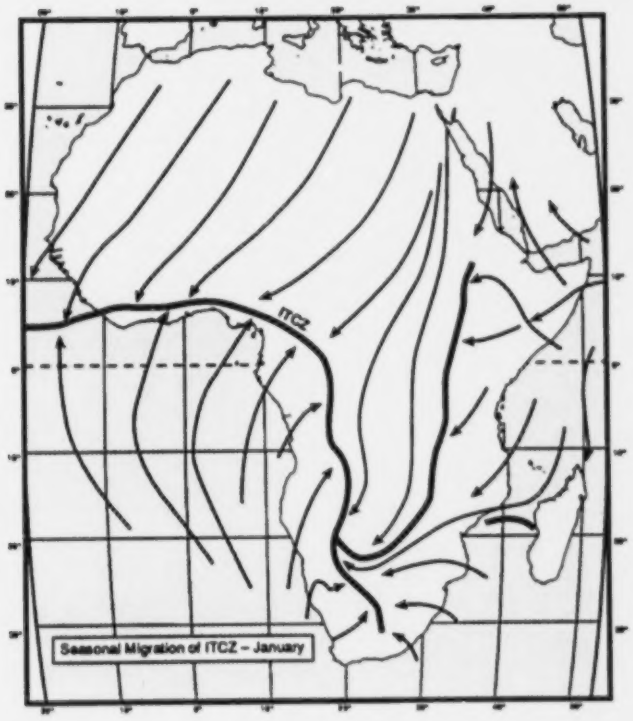
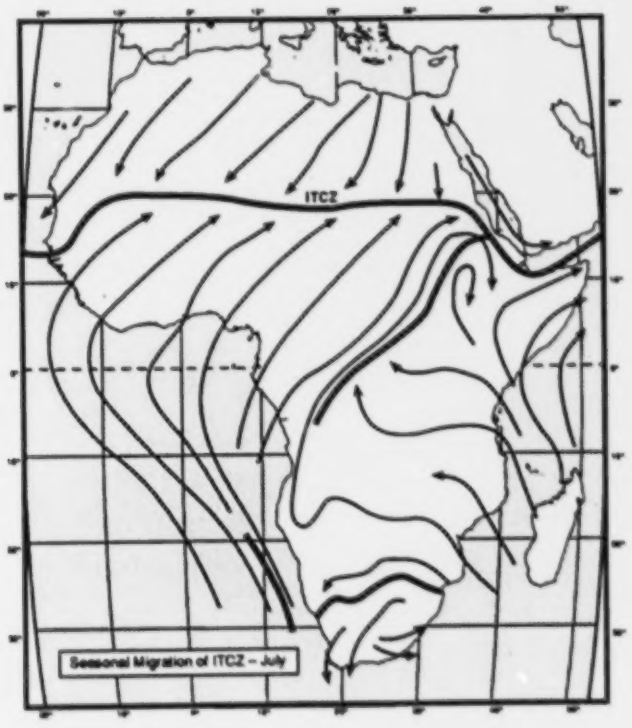
MAP OF CLIMATES



INTERTROPICAL CONVERGENCE ZONE





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APPENDICES

CONVERSION TABLES

Linear and Square Measures:

Length	Area
1 meter=3.28 feet	1 square meter=10.76 square feet
1 kilometer=0.62 mile	1 square kilometer=0.38 square mile
1 foot=0.3048 meter	1 square foot=0.929 square meter
1 mile=1.61 kilometer	1 square mile=2.58 square kilometers

Temperatures:

Celsius °C	Fahrenheit °F
40	104
35	95
30	86
25	77
20	68
15	59
10	50
5	41
0	32
-5	23
-10	14
-15	5
-17.8	0
-20	-4
-25	-13
-30	-22
-35	-31
-40	-40

Rules for Converting Temperature:

From °F to °C: $x\,°F = \frac{5}{9}(x\text{-}32)°C$

From °C to °F: $x\,°C = \frac{9}{5}x + 32°F$

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DATA BANK[3]

Principal Peaks of Africa:

Mountain	Height (ft./m.)	Country
Kilimanjaro	19,340/5,896	Tanzania
Mt. Kenya	17,058/5,201	Kenya
Margherita Peak	16,763/5,111	Zaire/Uganda
Ras Dashen Terara	15,158/4,621	Ethiopia
Mt. Meru	14,978/4,566	Tanzania
Karisimbi Volcano	14,787/4,508	Rwanda/Zaire
Mt. Elgon	14,178/4,323	Kenya/Uganda
Cameroon Mtn.	13,451/4,101	Cameroon
Emi Koussi	11,204/3,416	Chad
Tahat	9,541/2,909	Algeria
Maromokotro	9,436/2,877	Madagascar

Principal Rivers of Africa

River Name	Length (miles/km)
Nile	4,145/6685.5
Congo	2,900/4677.4
Niger	2,600/4193.5
Zambezi	1,700/2741.9
Kasai	1,338/2158.1
Orange	1,300/2096.8
Limpopo	1,100/1774.2

Principal Lakes of Africa

Lake Name	Size (sq. miles/sq. km)	Country
Lake Tanganyika	12,350/31,863	Tanzania/Zaire/Burundi/ Zambia
Lake Nyasa	11,150/28,767	Malawi/Mozambique/ Tanzania
Lake Chad	6,300/16,254	Cameroon/Chad/ Nigeria
Lake Rudolf	2,473/6,380	Ethiopia/Kenya

Footnotes

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[1]Main Source: O'Meara, Patrick and Phyllis M. Martin, Eds. (1977). Africa. Bloomington, IN: Indiana University Press.

[2]National Climatic Center. World Weather Records 1961-1970, Asheville, NC.

[3]Goode's World Atlas. (1992). Rand McNally, Chicago, IL.

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